

CARDIOPULMONARY RESUSCITATION MANIKIN WITH ANTISEPTIC CLEANING SYSTEM

BACKGROUND OF THE INVENTION

Manikins are frequently used as aids in teaching cardiopulmonary resuscitation (CPR). Students can practice and learn the proper techniques of chest massage and mouth-to-mouth resuscitation (MMR) without risk of harm to a live patient. It is important that these manikins simulate human appearance as closely as possible so that the students will be conditioned to act appropriately in a real life situation. Often the provision of verisimilitude requires the installation of complex and expensive instrumentation within the manikin.

In the CPR practice sessions, typically many students and instructors will take turns using the manikin and each will deposit germs from mouth-to-mouth breathing, not only on the manikin surface, but into the manikin itself, when the manikin has nose or mouth openings comprising a portion of a simulated respiratory tract. These germs may be inhaled by the next user and constitute a health problem. Antiseptic wipes will only remove the germs on the surface and will not clean the interior. Disassembling the manikin to remove and clean an interior respiratory tract is time consuming and may prove to be extremely difficult when the manikin construction is complex.

It is an object of this invention to provide a new and improved training manikin with a cleaning system that can easily be employed to clean thoroughly both the surface and the face and inside the nose and mouth openings after each use, without requiring the manikin to be disassembled or interfering with the simulation devices also inside the manikin.

It is another object of this invention to provide simplified but realistic simulation devices for cardiac, pulmonary and pulse systems, with instant readout of signal light and/or audio signal indicators.

It is another object of this invention to provide these simulation devices in a manikin the size, shape, and weight of a newborn or premature baby.

Training manikins in the past have provided systems simulating the heart, e.g. Clark U.S. Pat. No. 3,568,333, the lungs, e.g. Baerman U.S. Pat. No. 3,562,924, both the head and lungs, e.g. Smrcka U.S. Pat. No. 3,872,609, or the pulse, e.g. Gordon U.S. Pat. No. 3,947,974. None of these provides an easy to use and effective cleaning system, and none solves the problem of effectively, operatively housing all the simulated organ systems in a manikin the size of a newborn baby.

SUMMARY OF THE INVENTION

This invention provides a manikin in human form having a molded hollow body and head, with orifices at the nose and mouth simulating human nostrils and mouth. A passage leads from these openings, through the body cavity and out through a lower orifice. Outside the body, the passage is connected to a readout console box during simulated resuscitation procedures or to a flushing bag that can force a fluid up through the body and out the nose and mouth orifices. Within the body cavity are devices to simulate human organs, to detect proper location of pressure application, to measure the amount of pressure applied during chest massage, to measure air flow during mouth-to-mouth resuscitation, and to present an armpit pulse. However, the

"lung" is placed inside the head to save space, and pneumatic switches in the console box are used instead of mechanical switches in the body. Thus, all the simulation devices will fit into a newborn size manikin.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top perspective view of a manikin.

FIG. 2 is a top view of a horizontal cross-section of the manikin.

FIG. 3 is a sagittal cross-section of the chest portion of the manikin.

FIG. 4 is a cross-section of the chest portion of the manikin taken along line 4-4 of FIG. 2.

FIG. 5 is a sagittal cross-section of the head of the manikin.

FIG. 6 is a cross-section of an arm of the manikin taken along line 6-6 of FIG. 2;

FIG. 7 is a schematic diagram for the circuit wiring used to indicate proper CPR;

FIG. 8 is a schematic diagram of the simulated cardiac and pulmonary systems.

DETAILED DESCRIPTION OF THE INVENTION

The manikins of the present invention are typically in human form, and accordingly, reference will be made hereafter to anatomical features.

FIG. 1 illustrates a new and improved training manikin 10 in the form, size and weight of a newborn baby having a body 12 and a head 14, both made of molded plastic. The head 14 has a neck portion 11 which is permanently sealed to a corresponding neck portion 13 on the body 12. The head 14 has two orifices 16 for nostrils and an orifice 18 for a mouth, which extend through the head wall 19. In the sole of the left foot 20 is an opening 22 in the body wall 21. In the opening 22 is an airtight closure 23 with three apertures 24, 25 and 26. In the sole of the right foot 28 is an opening 30 in the body wall 21. The body 12 also includes a chest portion 32 and a neck 33.

In FIGS. 2, 3 and 4 the various primary vital systems simulating major human organs and their functions are shown. In the present embodiment, these systems comprise a cardiac system, for training in chest massage, a pulmonary system, for training in MMR, and a system to present two armpit pulses.

Effective chest massage on a human requires that the rescuer apply considerable pressure on the chest—pressure sufficient to compress the chest of an adult 2" and the chest of a baby from $\frac{1}{2}$ " to $\frac{3}{4}$ ", depending on its age. To avoid injury to the victim, the pressure must be applied at only one critical cite, specifically upon the middle third of the sternum, i.e., on the nipple line in mid sternum. It is essential, therefore, that any CPR training manikin will be equipped with a signaling means to indicate when the pressure being applied is properly located at the critical site.

In the present embodiment, the cardiac system contains two subsystems: the first to measure the amount of chest compression, the second to signal the point of pressure application. Prior manikins typically include mechanical switches and associated wiring disposed entirely within the body. The novel manikin of the present invention contains only a single mechanical switch within the body, while utilizing four pneumatic switches in an exterior console box 47. The first subsystem has a deformable rubber bulb 34 located subster-